MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2018/2019

MAX2053 – 3D SIMULATION

(All sections / Groups)

11 MARCH 2019
2.30 p.m - 4.30 p.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 10 pages of simulated questions. Read them carefully.

2. This exam paper consists of TWO parts:
   Part One: Multiple Choices — Answer **ALL 20** questions
   Part Two: Essay Questions — Answer **THREE** out of FOUR

2. Simulate all your answers in the Answer Booklet. May the force be with you.

PART ONE: MULTIPLE CHOICE QUESTIONS
Answer ALL Questions in the Multiple Choice Answer Sheet.

1. Which attribute below forces an active rigid body object to move in a specified direction at each frame of a simulation scene?

   A. Angular Momentum
   B. Initial Velocity
   C. Impulse Position
   D. Speed

2. Which dynamic attribute controls a field's strength?

   A. Attenuation
   B. Magnitude
   C. Power
   D. Force

3. Dr. Stranger wants to create sparks automatically from his whip when it touches any surface. What is the **BEST** tool for him to execute this effect?

   A. Use the Particle Collision Event editor
   B. Create an 'Emit from Object' particle emitter
   C. Create a particle emitter with the sprites wizard
   D. Use the Curve Flow effects emitting Streaks particles

4. Which statements below regarding Paint Effects uses in MAYA is **TRUE**?

   A. The Global Scale attribute is used to adjust the Paint Effect's Curve size.
   B. Paint Effects animation is controlled by dynamics simulation.
   C. A single MAYA Paint Effects brush can be attached to multiple Paint Effects curves.
   D. Paint Effects cannot be converted into Polygon.

5. Tony Stork has created a new Air Field in his simulation. However, the air field does not influence any dynamic objects he has in his scene. Which MAYA editor would he need to use to get his air field connected?

   A. Dynamics Connection Editor
   B. Dynamics Relationship Editor
   C. Dynamics Component Editor
   D. Dynamics Influence Editor

Continued .....

6. Di KopiOh created a rigid body totem and it is turning on the Y-axis. He wants the totem to spin out of control after 30 seconds of rotation. How can he achieve this using the rigid body dynamic systems?

   A. Assign a Turbulence field and keyframe its strength after 30 seconds
   B. Assign a Randomized value to the Rotate-Y attribute after 30 seconds
   C. Assign a Gravity field and keyframe its strength after 30 seconds
   D. Animate the Conserve value to fluctuate after 30 seconds

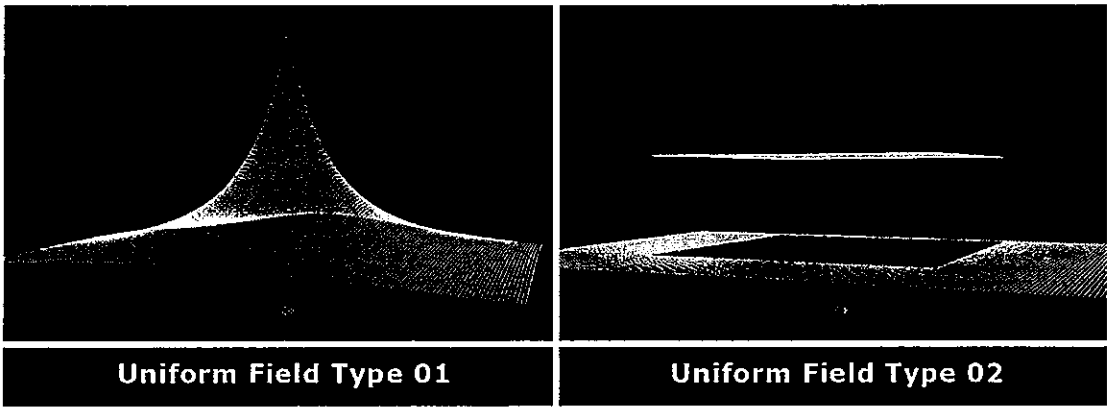

Image 01

7. *Image 01* shows two simulation results of a particle grid with a single uniform field (positive Y-axis direction) placed under it. Uniform Field Type 01 has a gradual fall-off result where else Uniform Field Type 02 has a distinctive cutoff. How would you achieve the effect similar to Uniform Field Type 02?

   A. Use the Volume Shape proxy option
   B. Turn off the Max Distance option
   C. Increase the attenuation value to 1
   D. Decrease the attenuation value to zero

8. Bruce Kanye used the '*Particle Instancer*' to execute a group of bats flying through the skies, but the bats are not rotating to match the movement of the particles. Which attribute does he need to change in order to achieve a proper effect?

   A. Aim Position > Change to XYZ
   B. Aim Rotation > Change to Speed
   C. Aim Direction > Change to Velocity
   D. Aim Axis > Change to X-Axis

Continued .....

9. Bruce Banger created a scene where his character smashes a metal door with his hands. He used Soft body dynamics to create a dented metal door effects but the soft body effect does not stop deforming after collision. What can he do to achieve a more convincing deformation result?

   I. Decrease the conserve value
   II. Increase the friction value
   III. Decrease the goal weight value
   IV. Increase the damping value

   A. I and II
   B. I and IV
   C. II and III
   D. III and IV

10. Which of the following statements below is **FALSE** regarding the 'Space-Scale' attribute?

   I. 'Space-Scale' attribute allows the simulation system to keep the space ratio similar across the entire scene's size.
   II. 'Space-Scale' allows an object to be resized to fit the scene's size, thus minimizing penetration issues with small size particles.
   III. 'Space-Scale' attribute only affects nParticles dynamic objects
   IV. A large 'Space-Scale' attribute means the ratio between spaces in the scene is smaller, making dynamic objects move faster.

   A. I, II and III
   B. I, II and IV
   C. II, III and IV
   D. All of the above

11. Which statement below is **TRUE** regarding MAYA *Ocean* effects?

   A. It creates full realistic 3D surface water deformation and collision
   B. The ocean's movement is simulated using Bifrost dynamic calculations
   C. It can interact with MAYA fields and collision object
   D. It is a flat NURBS surface with an *Ocean* shader assigned to the object

Continued .....

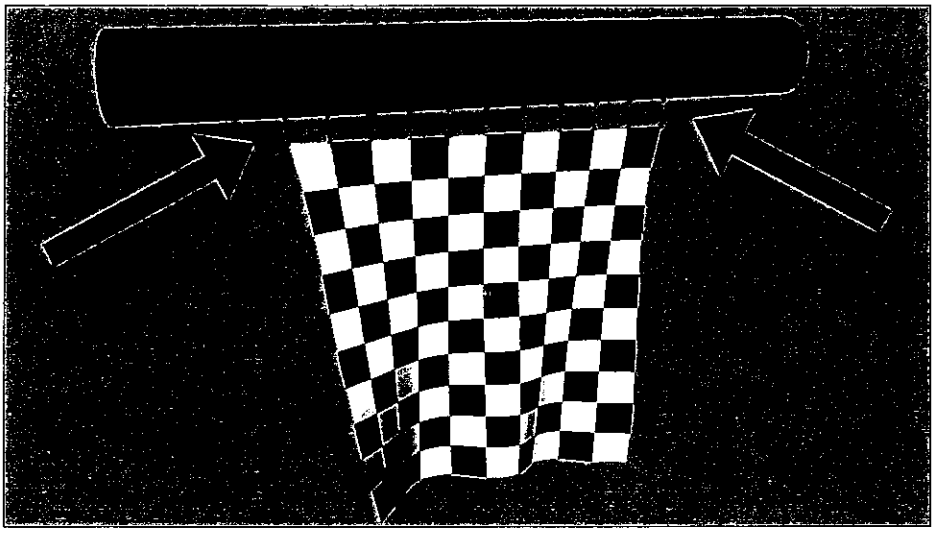

Image02

12. *Image 02* above shows an nCloth 3D plane constrained to a cylindrical polygon. Which nCloth constraint would be best to use to achieve this effect?

    A. Component Constraint
    B. Transform Constraint
    C. Point to Surface Constraint
    D. Hinge Constraint

13. Which options below can be used to control a particle's death?

    I. Particle Collision Event > Original Particle Dies
    II. Emitter Attribute > Rate
    III. Lifespan Mode > Random Range
    IV. Per Particle Array > Lifespan PP

    A. I, II and III
    B. I, III and IV
    C. II, III and IV
    D. All of the above

Continued .....

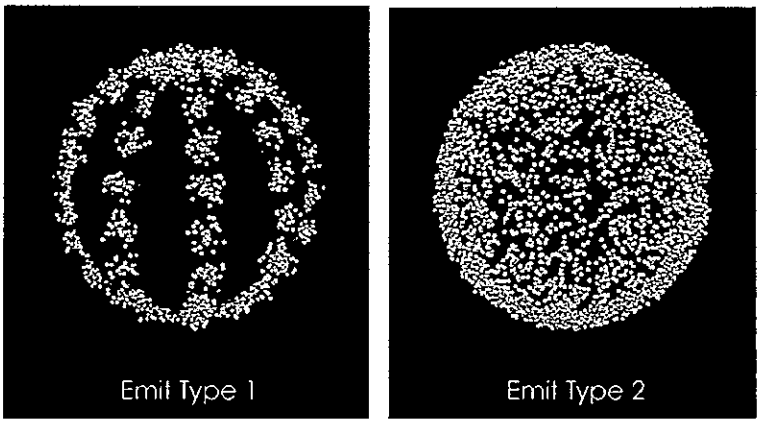

Image 03

14. *Image 03* above shows an attempt to emit particles from an object. By default, you would get a result similar to *Emit Type 1*. How would you achieve a particle emission of *Emit Type 2* instead?

    A. Change emission type to surface emission
    B. Increase the Spread attribute of the emitter
    C. Increase the particle emission rate to cover the whole object
    D. Change the particle type from points to spheres

15. Which file naming structure below is most suitable for use as an animated texture for sprite particles?

    A. sprite-001.png
    B. sprite_001.png
    C. sprite.001.png
    D. sprite.png.001

16. Which attribute below would you need to adjust in order to create a loose rope effect using *nHair*?

    A. Increase Stretch Resistance and Bend Resistance.
    B. Increase Stretch Resistance and decrease Bend Resistance
    C. Decrease Damp Value and Stretch Resistance
    D. Increase Damp Value and decrease Stretch Resistance

Continued .....

17. Enlarging a fluid container would cause the fluid content to look less dense. How would you increase the density of the fluid container?

    A. Increase the Fluid Resolution
    B. Increase the Voxel Resolution
    C. Increase the Threshold Resolution
    D. Increase the Viscosity Resolution

18. *nCloth* can sometime cause the cloth to bunch or clump up during simulation. This is due to crossovers of points that happened during the cloth simulation. What can you do to minimise the crossovers and ensure a cleaner, better *nCloth* simulation results?

    I. Increase the Max Self Collision Iteration value
    II. Turn on the Sort Stretch Links
    III. Minimise the Push Out Value
    IV. Turn on the Self Trapped Check option

    A. I and III
    B. I and IV
    C. II and III
    D. III and IV

19. Peter Porter had just created a web-like effect using *n*Hair dynamic setup. He realized that there were 3 new curves created together with his hair follicles. Which curves below are **NOT** parts of the *n*Hair dynamic system?

    A. Start Curve
    B. Current Curve
    C. Rest Curve
    D. Contact Curve

20. Jason Mamoa is adding a new water droplet effect using *nParticle* into an existing *nCloth* shirt simulation. He wanted the water droplet to collide and trickle down along the shirt. However, he could not get the water droplet to interact with the shirt. What must he do to solve this problem?

    A. Ensure that the *'Collision Layer'* for both *nDynamic* object is the same
    B. Ensure that the new *nParticle* is assigned to the *nCloth* nucleus
    C. Ensure that the new *nParticle* 'Collision Tolerance' is set to high
    D. Ensure that the *nCloth* is a Passive Collider object

Continued .....

PART TWO: ESSAY QUESTIONS

Answer THREE of the following Four Questions. Give DIRECT answers.

Question 1

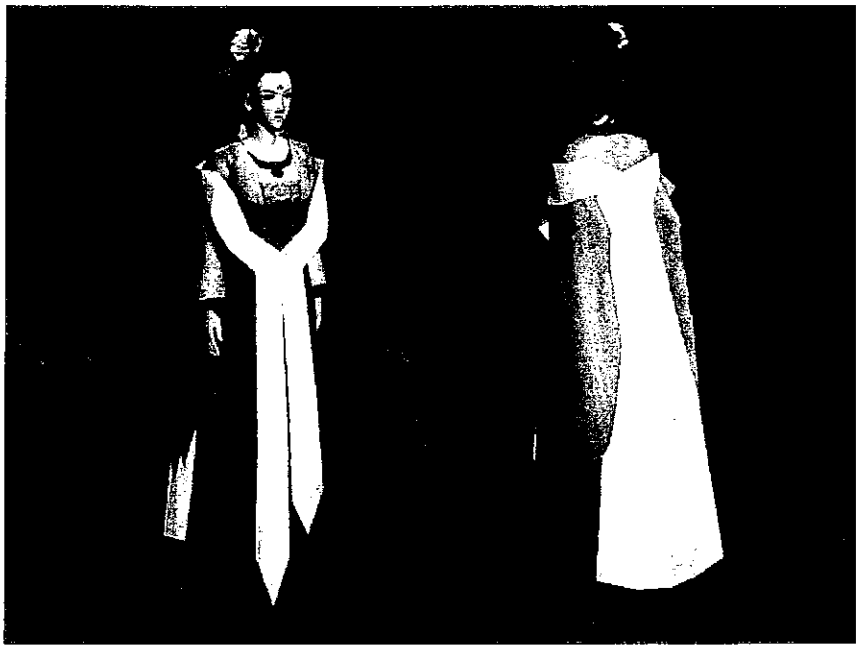

Image 04

I. *Image 04* above is an example of a complex clothing design for effects artist to simulate. Based on this design, explain **BRIEFLY** necessary *nCloth* simulation techniques you can do to ensure a *smooth, fast and accurate* cloth simulation.

(14 marks)

II. Explain **BRIEFLY** what *'Attract To Matching Mesh'* constraint is and how it can be used effectively in a character cloth animation setup?

(3 marks)

III. Give **THREE NON-CLOTHING** examples of real-life effects that could be created using *nCloth*.

(3 marks)

Continued .....

Question 2

Image 05

I. *Image 05* above is a slow-mo shot of a character's face being punched. The face deforms and reacts when the punch hits him but returns back to its original shape soon after. Please explain in detail how this effect can be achieved. EXPLAIN the major steps needed to accomplish the action using any suitable effect systems.

(16 marks)

II. What are the necessary steps that an artist need to do to ensure that a PaintFX brush could be successfully drawn on any given 3D surface?

(*4 marks*)

Question 3

I. What are the differences between Bullet and Maya Rigid Body System?

(*4 marks*)

II. Please briefly explain how these attributes affect a **BULLET** simulation process?

MASS:
INITIALLY SLEEPING:
LINEAR DAMPING:
ANGULAR DAMPING
CENTER OF MASS:
COLLIDER SHAPE TYPE:

(*6 marks*)

III. List **FIVE** Rigid Body constraints and briefly explain their functions.

(*10 marks*)

Question 4

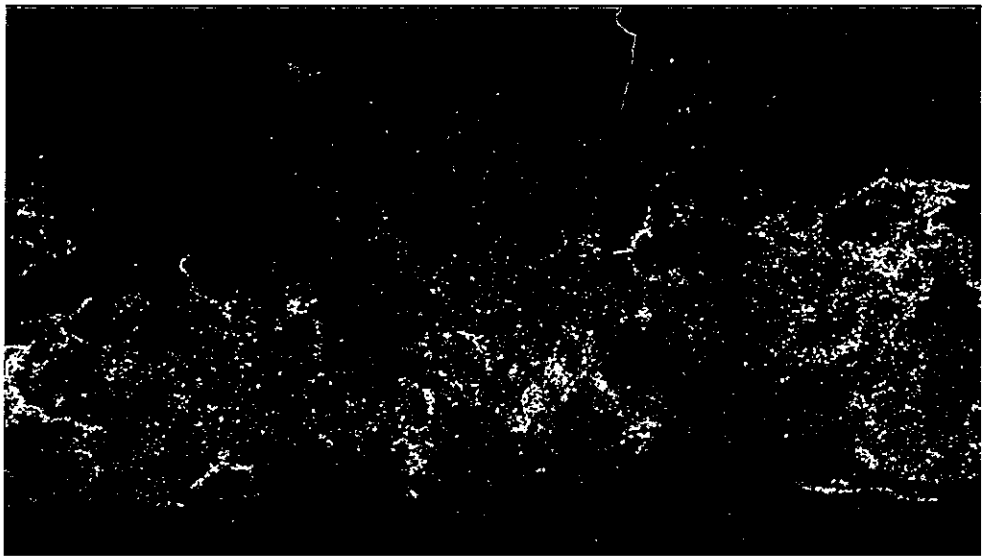

Image 06

I. *Image 06* above shows a guy splashing in a pool of water. The water movement is realistic and reacts accordingly to the character's animation. Suggest the best effect system to use to achieve this effect. Give a rough STEP-BY-STEP explanation on how to achieve this effect using the system suggested.

(16 marks)

II. What is MASTER VOXEL SIZE in liquid simulation? How would adjusting this value affect the simulation results?

(*4 marks*)

**Please check, re-check and triple-check your answers until the exam ends*

**End of Paper*